

## Chapter 02 Chemical Basis of Life

### Multiple Choice Questions

1. Chemistry deals with

- A.** the composition and changes of substances that make up living as well as non-living matter.
- B. the composition of organisms only.
- C. the composition of non-living matter only.
- D. energy sources.
- E. none of the above.

*Difficulty Level: Remember/Understand*  
*Learning Outcome: 02.01*  
*Topic: Chemistry*

2. Biochemistry is the study of

- A. the origin of life.
- B.** chemical reactions in organisms.
- C. how organisms relate to their environment.
- D. how drugs affect the body.
- E. energy transfer in non-living matter.

*Difficulty Level: Evaluate/Create*  
*Learning Outcome: 02.01*  
*Topic: Chemistry*

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3. Chemistry is important to the study of physiology because
- A. we eat chemicals.
  - B. body functions reflect cellular functions that reflect chemical changes.
  - C. drugs are chemicals.
  - D. chemical reactions enable our bodies to extract energy from nutrients.
  - E. all of the above.**

*Difficulty Level: Evaluate/Create*  
*Learning Outcome: 02.01*  
*Topic: Chemistry*

4. Which of the following substances is an element?
- A. Iron**
  - B. Water
  - C. Salt
  - D. Glucose
  - E. Fat

*Difficulty Level: Apply/Analyze*  
*Learning Outcome: 02.02*  
*Topic: Chemistry*

5. Which of the following substances account for more than 95% of the human body?
- A. Carbon, hydrogen, oxygen, nitrogen**
  - B. Calcium, hydrogen, oxygen, nitrogen
  - C. Carbon, phosphorus, oxygen, hydrogen
  - D. Calcium, phosphorus, hydrogen, nitrogen
  - E. Carbon, calcium, nitrogen, hydrogen

*Difficulty Level: Remember/Understand*  
*Learning Outcome: 02.02*  
*Topic: Chemistry*

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6. The atoms of two types of elements are likely to have
- A. the same size and same weight.
  - B. the same size but different weights.
  - C. different sizes but the same weight.
  - D.** different sizes and different weights.
  - E. different colors.

*Difficulty Level: Evaluate/Create*  
*Learning Outcome: 02.02*  
*Topic: Chemistry*

7. Which of the following is a form of ionizing radiation?
- A. Cosmic radiation
  - B. Gamma radiation
  - C.** Cosmic radiation and gamma radiation
  - D. Neither cosmic nor gamma radiation
  - E. None of the above.

*Difficulty Level: Evaluate/Create*  
*Learning Outcome: 02.02*  
*Topic: Chemistry*

8. The atomic weight of an element whose atoms contain 8 protons, 8 electrons, and 8 neutrons is
- A. 8.
  - B.** 16.
  - C. 24.
  - D. 32.
  - E. 64.

*Difficulty Level: Apply/Analyze*  
*Learning Outcome: 02.02*  
*Topic: Chemistry*

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9. The atoms of the isotopes of a particular element vary in the number of
- A. electrons.
  - B. protons.
  - C.** neutrons.
  - D. nuclei.
  - E. molecules.

*Difficulty Level: Remember/Understand*  
*Learning Outcome: 02.02*  
*Topic: Chemistry*

10. The first electron shell of an atom can hold a maximum of
- A. 1 electron.
  - B.** 2 electrons.
  - C. 4 electrons.
  - D. 8 electrons.
  - E. 16 electrons.

*Difficulty Level: Remember/Understand*  
*Learning Outcome: 02.02*  
*Topic: Chemistry*

11. An atom that has 3 electrons in its second shell and a filled first shell will
- A.** lose 3 electrons from its second shell.
  - B. lose all of the electrons from its first shell.
  - C. lose all of the electrons from its first and second shells.
  - D. gain 2 electrons in its second shell.
  - E. gain 5 electrons in its second shell.

*Difficulty Level: Apply/Analyze*  
*Learning Outcome: 02.02*  
*Topic: Chemistry*

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12. The formula H<sub>2</sub>O means

- A. an atom contains two hydrogen molecules and one oxygen molecule.
- B. an atom contains one hydrogen molecule and two oxygen molecules.
- C.** a molecule contains two hydrogen atoms and one oxygen atom.
- D. a molecule contains one hydrogen atom and two oxygen atoms.
- E. a molecule contains two hydrogen atoms and two oxygen atoms.

*Difficulty Level: Apply/Analyze*

*Learning Outcome: 02.02*

*Topic: Chemistry*

13. A decomposition reaction can be symbolized by

- A.  $A + B \rightarrow C + D$ .
- B.  $A + B \rightarrow AB$ .
- C.**  $AB \rightarrow A + B$ .
- D.  $C + D \rightarrow AB$ .
- E. none of the above.

*Difficulty Level: Evaluate/Create*

*Learning Outcome: 02.02*

*Topic: Chemistry*

14. A solution that contains equal numbers of hydrogen and hydroxyl ions is

- A. acidic.
- B. basic.
- C. alkaline.
- D.** neutral.
- E. toxic.

*Difficulty Level: Remember/Understand*

*Learning Outcome: 02.02*

*Topic: Chemistry*

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15. Electrolytes that release hydrogen ions in water are

- A. bases.
- B. catalysts
- C. toxins.
- D. electrons.
- E.** acids

*Difficulty Level: Evaluate/Create*

*Learning Outcome: 02.02*

*Topic: Chemistry*

16. The difference in hydrogen ion concentration between solutions with pH 4 and pH 5 is

- A. twofold.
- B. fivefold.
- C.** tenfold.
- D. twentyfold.
- E. a hundredfold

*Difficulty Level: Apply/Analyze*

*Learning Outcome: 02.02*

*Topic: Chemistry*

17. A chemical reaction in which pairs of different molecules trade positions is a(n)

- A. decomposition reaction.
- B.** exchange reaction.
- C. reversible reaction.
- D. synthesis reaction.
- E. psychotic reaction.

*Difficulty Level: Evaluate/Create*

*Learning Outcome: 02.02*

*Topic: Chemistry*

18. Consider the following list of commonly found items and their pH values:

Battery acid	1.0
Vinegar	2.2
Grapes	3.5-4.5
Tomato	4.0-4.5
Beer	4.2
Coffee	5.0
White bread	5.0-6.0
Butter	6.1-6.4
Egg whites	7.6-8.0
Baking soda	8.3
Milk of magnesia	10.6
Bleach	12.8

Which of the choices includes all acids?

- A. Egg whites, baking soda, milk of magnesia, and bleach
- B. Tomatoes, egg whites, and baking soda
- C. Vinegar, grapes, tomatoes, and coffee**
- D. Beer, butter, and baking soda
- E. White bread, butter, and bleach

*Difficulty Level: Apply/Analyze*

*Learning Outcome: 02.02*

*Topic: Chemistry*

19. Electrolytes are substances that

- A. form covalent bonds with water.
- B. ionize when dissolved in water.**
- C. cannot conduct electricity in solution.
- D. can electrocute someone.
- E. are not found in the human body in any appreciable amounts.

*Difficulty Level: Remember/Understand*

*Learning Outcome: 02.02*

*Topic: Chemistry*

20. The pH scale measures the
- A.** concentration of hydrogen ions in solution.
  - B. number of molecules of salts dissolved in water.
  - C. number of hydroxyl ions in water.
  - D. strength of an electrical current that a solution carries.
  - E. number of water molecules in solution.

*Difficulty Level: Remember/Understand*  
*Learning Outcome: 02.02*  
*Topic: Chemistry*

21. Which of the following is the most abundant inorganic substance in cells?
- A. Carbohydrate
  - B.** Water
  - C. Lipid
  - D. Protein
  - E. Bone

*Difficulty Level: Evaluate/Create*  
*Learning Outcome: 02.03*  
*Topic: Chemistry*

22. A person has alkalosis if the blood pH
- A. rises above 7.0.
  - B. drops below 7.0.
  - C. rises above 3.4.
  - D. drops below 7.4.
  - E.** rises above 7.4.

*Difficulty Level: Remember/Understand*  
*Learning Outcome: 02.02*  
*Topic: Chemistry*



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23. The four most abundant elements in the human body are

- A. Na, Mg, P, and K.
- B. Ca, C, O, and Na.
- C.** O, C, H, and N.
- D. N, H, Mg, and K.
- E. H<sub>2</sub>O and CH<sub>4</sub>.

*Difficulty Level: Evaluate/Create*

*Learning Outcome: 02.02*

*Topic: Chemistry*

24. Matter is composed of \_\_\_\_\_, which are composed of \_\_\_\_\_.

- A.** elements; atoms
- B. molecules; elements
- C. atoms; molecules
- D. chemicals; molecules
- E. atoms; cells

*Difficulty Level: Evaluate/Create*

*Learning Outcome: 02.02*

*Topic: Chemistry*

25. A complete atom is electrically neutral because the number of

- A. positively charged protons and neutral neutrons are equal.
- B. negatively charged electrons and neutral neutrons are equal.
- C.** negative electrons and positive protons are equal.
- D. electrons is greater than the number of protons and neutrons combined.
- E. none of the above

*Difficulty Level: Evaluate/Create*

*Learning Outcome: 02.02*

*Topic: Chemistry*

Chapter 02 - Chemical Basis of Life

26. Atomic number equals the number of \_\_\_\_\_ and atomic weight equals the \_\_\_\_\_.  
A. atoms in an element; weight of all the atoms  
B. protons in the nucleus; weight of all the electrons  
C. neutrons in the nucleus; number of protons plus electrons  
**D.** protons; number of protons plus neutrons  
E. none of the above.

*Difficulty Level: Remember/Understand*  
*Learning Outcome: 02.02*  
*Topic: Chemistry*

27. Synthesis reactions are particularly important in the body for  
A. release of energy.  
B. digestion of food products.  
**C.** growth of body parts.  
D. neutralization of acids by buffers.  
E. clearance of toxins.

*Difficulty Level: Remember/Understand*  
*Learning Outcome: 02.02*  
*Topic: Chemistry*

28. In a covalent bond  
A. one atom shares and another atom gains electrons.  
**B.** atoms share pairs of electrons.  
C. oppositely charged atoms attract.  
D. oppositely charged atoms repel.  
E. all of the above.

*Difficulty Level: Evaluate/Create*  
*Learning Outcome: 02.02*  
*Topic: Chemistry*

Chapter 02 - Chemical Basis of Life

29. On the pH scale

- A. a tenfold difference in hydrogen ion concentration separates each whole number
- B. the lower the whole number on the scale, the greater the  $H^+$  concentration.
- C. pH values above 7 are basic.
- D. pH values below 7 are acidic.
- E.** all of the above.

*Difficulty Level: Evaluate/Create*

*Learning Outcome: 02.02*

*Topic: Chemistry*

30. Sodium ions and calcium ions are examples of

- A.** cations.
- B. dogions.
- C. anions.
- D. salts.
- E. molecules.

*Difficulty Level: Apply/Analyze*

*Learning Outcome: 02.02*

*Topic: Chemistry*

31. When cations and anions meet they

- A. repel.
- B.** form a 3-D structure.
- C. form covalent bonds.
- D. form electrolytes.
- E. form cells.

*Difficulty Level: Remember/Understand*

*Learning Outcome: 02.02*

*Topic: Chemistry*

Chapter 02 - Chemical Basis of Life

32. An acid reacting with a base is

- A. a synthesis reaction.
- B. hydrolysis.
- C. a decomposition reaction.
- D.** an exchange reaction.
- E. an explosive event.

*Difficulty Level: Remember/Understand*

*Learning Outcome: 02.02*

*Topic: Chemistry*

33. Water causes ionically-bonded molecules to

- A. bond more strongly.
- B.** dissociate.
- C. degrade.
- D. denature.
- E. explode.

*Difficulty Level: Remember/Understand*

*Learning Outcome: 02.02*

*Topic: Chemistry*

34. Bases reacting with acids form \_\_\_\_\_ and water.

- A. buffers
- B.** electrolytes
- C. salts
- D. proteins
- E. hydrochloric acid

*Difficulty Level: Remember/Understand*

*Learning Outcome: 02.02*

*Topic: Chemistry*

Chapter 02 - Chemical Basis of Life

35. Organic molecules \_\_\_\_\_, whereas inorganic molecules \_\_\_\_\_.
- A. contain carbon; do not dissolve in water
  - B. do not contain carbon; do contain carbon
  - C.** contain carbon; do not contain carbon
  - D. are small; are very large
  - E. are sprinkled on organically-grown foods; are removed from foods

*Difficulty Level: Evaluate/Create*  
*Learning Outcome: 02.03*  
*Topic: Chemistry*

36. The unique, three-dimensional structure of a protein molecule is determined largely by
- A. oxygen bonds.
  - B. covalent bonds.
  - C. ionic bonds.
  - D.** hydrogen bonds.
  - E. stocks and bonds.

*Difficulty Level: Remember/Understand*  
*Learning Outcome: 02.03*  
*Topic: Chemistry*

37. In the body, oxygen
- A. reacts with water to form carbonic acid.
  - B. is used in various metabolic processes.
  - C. helps regulate body temperature.
  - D. exchanges with carbon dioxide.
  - E.** releases energy from glucose during cellular respiration

*Difficulty Level: Evaluate/Create*  
*Learning Outcome: 02.03*  
*Topic: Chemistry*

Chapter 02 - Chemical Basis of Life

38. Which of the following is characteristic of carbohydrates?
- A. They contain C, H, O, with twice as many hydrogen as oxygen atoms.
  - B. They provide much of the energy that the cell requires.
  - C. They often are stored as reserve energy supplies.
  - D. They include sugars and starches.
  - E. all of the above**

*Difficulty Level: Evaluate/Create*  
*Learning Outcome: 02.03*  
*Topic: Chemistry*

39. A simple carbohydrate
- A.** has a molecular formula of  $C_6H_{12}O_6$ .
  - B. is a building block of protein.
  - C. consists of several joined chains.
  - D. has only one nucleotide.
  - E. is a building block of fat.

*Difficulty Level: Remember/Understand*  
*Learning Outcome: 02.03*  
*Topic: Chemistry*

40. Lipids
- A. are insoluble in water.
  - B. include phospholipids, cholesterol, and fats.
  - C. contain C, H, and O, but with proportionately less oxygen than in carbohydrates.
  - D. are organic.
  - E. all of the above**

*Difficulty Level: Remember/Understand*  
*Learning Outcome: 02.03*  
*Topic: Chemistry*

Chapter 02 - Chemical Basis of Life

41. A protein can denature when
- A. bonds between carbon and oxygen break.
  - B. weak hydrogen bonds break.**
  - C. peptide bonds break.
  - D. hydrogen bonds form.
  - E. none of the above

*Difficulty Level: Remember/Understand*  
*Learning Outcome: 02.03*  
*Topic: Chemistry*

42. Which of the following is not organic?
- A. Oxygen**
  - B. Lipids
  - C. Nucleic acids
  - D. Enzymes
  - E. Cholesterol

*Difficulty Level: Evaluate/Create*  
*Learning Outcome: 02.03*  
*Topic: Chemistry*

43. Saturated fats \_\_\_\_\_ than unsaturated fats.
- A. are heavier
  - B. are more soluble in water
  - C. have more single carbon-carbon bonds**
  - D. have fewer hydrogen atoms bonded to carbon atoms
  - E. taste better

*Difficulty Level: Evaluate/Create*  
*Learning Outcome: 02.03*  
*Topic: Chemistry*

Chapter 02 - Chemical Basis of Life

44. Proteins

- A. are structural materials
- B. are chemical messengers.
- C. contain C, H, O, and N, and sometimes sulfur.
- D. can function as enzymes.
- E. all of the above**

*Difficulty Level: Remember/Understand*

*Learning Outcome: 02.03*

*Topic: Chemistry*

45. An enzyme is a \_\_\_\_\_.

- A. protein that speeds up chemical reactions without being changed or depleted**
- B. protein that functions as a hormone
- C. protein that inhibits chemical reactions by being changed or depleted
- D. fibrous protein that is part of certain tissues in the body
- E. fat that speeds up chemical reactions without being changed or depleted

*Difficulty Level: Evaluate/Create*

*Learning Outcome: 02.03*

*Topic: Chemistry*

46. The parts of a protein that change when it denatures are

- A. the primary and secondary structures.
- B. the secondary and tertiary structures.**
- C. the amino acid sequence and the secondary structure.
- D. the tertiary and quaternary structures.
- E. the amino and carboxyl groups exchange locations.

*Difficulty Level: Evaluate/Create*

*Learning Outcome: 02.03*

*Topic: Chemistry*



Chapter 02 - Chemical Basis of Life

47. DNA

- A. helps synthesize nucleic acids.
- B. is important in building fats.
- C.** stores genetic information.
- D. is important in building carbohydrates.
- E. provides cellular energy.

*Difficulty Level: Evaluate/Create*

*Learning Outcome: 02.03*

*Topic: Chemistry*

48. Nucleic acids are

- A. very small, simple molecules.
- B. structural molecules that do not have a function other than support.
- C.** composed of building blocks called nucleotides.
- D. sources of cellular energy.
- E. all of the above.

*Difficulty Level: Evaluate/Create*

*Learning Outcome: 02.03*

*Topic: Chemistry*

49. The informational content of DNA and RNA is in the nitrogenous bases because

- A.** the bases are of several types and therefore can form a sequence.
- B. they contain nitrogen.
- C. the sugars and phosphates vary too much.
- D. the bases are also parts of amino acids.
- E. nitrogen comes in several different forms.

*Difficulty Level: Evaluate/Create*

*Learning Outcome: 02.03*

*Topic: Chemistry*

50. In phenylketonuria, an individual cannot break down the amino acid phenylalanine. Molecules that include phenylalanine build up in the blood, which causes mental retardation and other symptoms. This inherited disease can be controlled by following a diet that is very low in

- A. carbohydrates.
- B. lipids.
- C. protein.**
- D. nucleic acids.
- E. tomatoes.

*Difficulty Level: Apply/Analyze*

*Learning Outcome: 02.03*

*Topic: Chemistry*

51. Table sugar breaking down into glucose and fructose is a(n) \_\_\_\_\_ reaction.

- A. synthesis
- B. hydrolysis
- C. decomposition**
- D. exchange reaction
- E. metabolic

*Difficulty Level: Apply/Analyze*

*Learning Outcome: 02.02*

*Topic: Chemistry*

52. Nucleic acids include

- A. proteins and DNA.
- B. RNA and DNA.**
- C. enzymes and RNA.
- D. steroids and triglycerides.
- E. vitamins and minerals.

*Difficulty Level: Apply/Analyze*

*Learning Outcome: 02.03*

*Topic: Chemistry*

Chapter 02 - Chemical Basis of Life

53. DNA and RNA differ in that

- A. RNA has deoxyribose and DNA has ribose.
- B. RNA is double-stranded and DNA is single-stranded.
- C.** DNA holds genetic information and RNA uses that information to synthesize protein
- D. RNA holds genetic information and DNA uses that information to synthesize protein
- E. DNA is found in males and RNA is found in females.

*Difficulty Level: Evaluate/Create*

*Learning Outcome: 02.03*

*Topic: Chemistry*

54. The type of organic molecule that can replicate is a

- A. protein.
- B. lipid.
- C. carbohydrate.
- D.** nucleic acid.
- E. salt.

*Difficulty Level: Evaluate/Create*

*Learning Outcome: 02.03*

*Topic: Chemistry*

55. Conformation is

- A.** the three dimensional shape of a molecule, such as a protein.
- B. the energy held in the bonds of an organic molecule, such as a protein.
- C. the ability of RNA to copy itself.
- D. a religious service.
- E. none of the above

*Difficulty Level: Apply/Analyze*

*Learning Outcome: 02.03*

*Topic: Chemistry*

Chapter 02 - Chemical Basis of Life

56. An organic compound contains

- A. water and a salt.
- B. oxygen and nitrogen.
- C. carbon and oxygen.
- D. nitrogen and hydrogen.
- E.** carbon and hydrogen.

*Difficulty Level: Evaluate/Create*

*Learning Outcome: 02.02*

*Topic: Chemistry*

57. Carbon can form \_\_\_\_ covalent bonds.

- A. 1
- B. 2
- C.** 4
- D. 8
- E. 16

*Difficulty Level: Remember/Understand*

*Learning Outcome: 02.03*

*Topic: Chemistry*

58. Which of these is not a monosaccharide?

- A. Ribose
- B. 5-carbon sugar
- C. 6-carbon sugar
- D.** Glycogen
- E. Sucrose

*Difficulty Level: Evaluate/Create*

*Learning Outcome: 02.03*

*Topic: Chemistry*

59. Glycogen is stored in the liver and \_\_\_\_\_.

- A. spleen
- B. skeletal muscles**
- C. pancreas
- D. heart
- E. toenails

*Difficulty Level: Remember/Understand*

*Learning Outcome: 02.03*

*Topic: Chemistry*

60. A triglyceride consists of

- A. 3 amino acids.
- B. 3 glucose molecules.
- C. 1 glycerol and 3 fatty acids.
- D. 3 fatty acids and 1 glycerol.**
- E. 3 glycerols and 1 fatty acid.

*Difficulty Level: Evaluate/Create*

*Learning Outcome: 02.03*

*Topic: Chemistry*

61. Which of the following compounds is not hydrophilic?

- A. Carbohydrates
- B. Lipids**
- C. Proteins
- D. Nucleic Acids
- E. Water

*Difficulty Level: Evaluate/Create*

*Learning Outcome: 02.03*

*Topic: Chemistry*

62. Which of the following molecules does not have a polar region?

- A. Water
- B. Triglycerides**
- C. Tryptophan
- D. Glucose
- E. Kryptonite

*Difficulty Level: Evaluate/Create*

*Learning Outcome: 02.03*

*Topic: Chemistry*

63. A biomarker is

- A. a gene that encodes a particular protein.
- B. always a protein.
- C. a body chemical associated with a particular disease or exposure to a toxin.**
- D. a book mark that one uses when studying from a biology textbook.
- E. a protein that encodes a particular gene.

*Difficulty Level: Remember/Understand*

*Topic: Chemistry*

64. An example of a biomarker is

- A. cholesterol.**
- B. any DNA sequence.
- C. sodium chloride.
- D. hydrogen.
- E. all of the above.

*Difficulty Level: Apply/Analyze*

*Topic: Chemistry*

Chapter 02 - Chemical Basis of Life

65. A biomarker test for cancer should ideally be
- A. inexpensive
  - B. easy to perform.
  - C. sensitive.
  - D. specific.
  - E.** all of the above.

*Difficulty Level: Evaluate/Create*  
*Topic: Chemistry*

66. Which of the following isotopes has the longest half-life?
- A. Iodine-131.
  - B. Iron-59.
  - C. Phosphorus-32.
  - D.** Radium-226.
  - E. Fahrenheit-451.

*Difficulty Level: Remember/Understand*  
*Topic: Chemistry*

67. The \_\_\_\_\_ uses the element iodide.
- A. spleen
  - B. liver
  - C. thymus
  - D.** thyroid
  - E. spinal cord

*Difficulty Level: Remember/Understand*  
*Topic: Chemistry*

68. The isotope most likely to be used to study the thyroid gland is

- A. iodine-141.
- B. iron-59.
- C. thallium-201.
- D. cobalt-60.
- E. carbon-14.

*Difficulty Level: Remember/Understand*

*Topic: Chemistry*

69. Atomic radiation is useful for treating cancer because

- A. radiation affects cancer cells but not normal cells.
- B. radiation protects normal cells against the effects of cancer.
- C. radiation harms cancer cells more readily than it does most non-cancer cells
- D. chemicals in normal cells are not affected by radiation.
- E. it kills all cells.

*Difficulty Level: Evaluate/Create*

*Topic: Chemistry*

70. Exposure to ionizing radiation may

- A. cloud the lens of the eye.
- B. cause diabetes.
- C. cause a woman to conceive twins.
- D. cause a urinary tract infection.
- E. none of the above.

*Difficulty Level: Remember/Understand*

*Topic: Chemistry*



Chapter 02 - Chemical Basis of Life

71. Which of the following is not a source of ionizing radiation?

- A. Cosmic rays from outer space
- B.** Cholesterol and triglycerides
- C. Atomic and nuclear weapons
- D. Smoke detectors
- E. TV components

*Difficulty Level: Apply/Analyze*

*Topic: Chemistry*

72. A CT scan differs from a conventional X-ray image because it is

- A. two dimensional.
- B.** three dimensional.
- C. four dimensional.
- D. safer.
- E. not radioactive.

*Difficulty Level: Evaluate/Create*

*Topic: Chemistry*

73. PET imaging follows the emission of

- A.** positrons.
- B. electrons.
- C. neutrons.
- D. protons.
- E. mice.

*Difficulty Level: Remember/Understand*

*Topic: Chemistry*

### True / False Questions

74. Chemistry is the study of the composition of matter and how matter changes.

**TRUE**

*Difficulty Level: Remember/Understand  
Learning Outcome: 02.01  
Topic: Chemistry*

75. The number of protons in an atom of an element equals its atomic weight.

**FALSE**

*Difficulty Level: Remember/Understand  
Learning Outcome: 02.02  
Topic: Chemistry*

76. Radioactive isotopes have stable nuclei.

**FALSE**

*Difficulty Level: Remember/Understand  
Learning Outcome: 02.02  
Topic: Chemistry*

77. Sodium and chloride atoms combine readily because they both lose electrons.

**FALSE**

*Difficulty Level: Evaluate/Create  
Learning Outcome: 02.02  
Topic: Chemistry*

78. The symbol  $\text{Na}^+$  represents a sodium atom that has lost an electron.

**TRUE**

*Difficulty Level: Apply/Analyze  
Learning Outcome: 02.02  
Topic: Chemistry*

79. An atom that has gained or lost electrons is called an ion.

**TRUE**

*Difficulty Level: Remember/Understand*

*Learning Outcome: 02.02*

*Topic: Chemistry*

80. Water is an example of a compound.

**TRUE**

*Difficulty Level: Remember/Understand*

*Learning Outcome: 02.02*

*Topic: Chemistry*

81. A substance that releases hydrogen ions in water is a base.

**FALSE**

*Difficulty Level: Remember/Understand*

*Learning Outcome: 02.02*

*Topic: Chemistry*

82. An acid reacting with a base produces a salt.

**TRUE**

*Difficulty Level: Remember/Understand*

*Learning Outcome: 02.02*

*Topic: Chemistry*

83. An atom with 10 protons and 8 electrons is electrically neutral.

**FALSE**

*Difficulty Level: Apply/Analyze*

*Learning Outcome: 02.02*

*Topic: Chemistry*

84. Chemically inert atoms always have their outermost electron shell full.

**TRUE**

*Difficulty Level: Remember/Understand*

*Learning Outcome: 02.02*

*Topic: Chemistry*

85. An acid is an electrolyte that releases hydroxyl ions ( $\text{OH}^-$ ) in water. An example is sodium hydroxide.

**FALSE**

*Difficulty Level: Remember/Understand*

*Learning Outcome: 02.02*

*Topic: Chemistry*

86. A base is an electrolyte that releases ions that combine with hydrogen ions. An example is potassium hydroxide (KOH).

**TRUE**

*Difficulty Level: Remember/Understand*

*Learning Outcome: 02.02*

*Topic: Chemistry*

87. An electrolyte ionizes in water.

**TRUE**

*Difficulty Level: Remember/Understand*

*Learning Outcome: 02.02*

*Topic: Chemistry*

88. A person with alkalosis has a blood pH less than 7.4.

**FALSE**

*Difficulty Level: Remember/Understand*

*Learning Outcome: 02.02*

*Topic: Chemistry*

89. A complex carbohydrate has a phosphate group attached to a sugar molecule.

**FALSE**

*Difficulty Level: Evaluate/Create*

*Learning Outcome: 02.03*

*Topic: Chemistry*

90. Cholesterol, a type of lipid, is composed of 3 fatty acid chains attached to glycerol.

**FALSE**

*Difficulty Level: Apply/Analyze*

*Learning Outcome: 02.03*

*Topic: Chemistry*

91. Glycogen is a complex carbohydrate that we get by eating plants.

**FALSE**

*Difficulty Level: Apply/Analyze*

*Learning Outcome: 02.03*

*Topic: Chemistry*

92. A phospholipid differs structurally from a triglyceride in that it has three phosphate groups attached to the glycerol molecule rather than three fatty acid chains.

**FALSE**

*Difficulty Level: Evaluate/Create*

*Learning Outcome: 02.03*

*Topic: Chemistry*

93. Nucleic acids are composed of building blocks called amino acids, which have an amine and an acid group in the molecule.

**FALSE**

*Difficulty Level: Evaluate/Create*

*Learning Outcome: 02.03*

*Topic: Chemistry*

94. Proteins consist of sequences of amino acids.

**TRUE**

*Difficulty Level: Remember/Understand*

*Learning Outcome: 02.03*

*Topic: Chemistry*

95. Proteins encode nucleic acids.

**FALSE**

*Difficulty Level: Evaluate/Create*

*Learning Outcome: 02.03*

*Topic: Chemistry*

96. DNA and RNA are nucleic acids.

**TRUE**

*Difficulty Level: Remember/Understand*

*Learning Outcome: 02.03*

*Topic: Chemistry*

### **Fill in the Blank Questions**

97. The parts of an atom that carry single negative electrical charges are called \_\_\_\_\_.

**electrons**

*Difficulty Level: Remember/Understand*

*Learning Outcome: 02.02*

*Topic: Chemistry*

98. When atoms form chemical bonds, the subatomic particles that directly interact are the

\_\_\_\_\_.  
**electrons**

*Difficulty Level: Remember/Understand*

*Learning Outcome: 02.02*

*Topic: Chemistry*

99. The type of subatomic particle that does not have an electrical charge is a \_\_\_\_\_.

**neutron**

*Difficulty Level: Remember/Understand*

*Learning Outcome: 02.02*

*Topic: Chemistry*

100. The type of chemical bond formed when ions with opposite electrical charges attracted is an \_\_\_\_\_ bond.

**ionic**

*Difficulty Level: Remember/Understand*

*Learning Outcome: 02.02*

*Topic: Chemistry*

101. Two or more atoms bonding form a \_\_\_\_\_.

**molecule**

*Difficulty Level: Remember/Understand*

*Learning Outcome: 02.02*

*Topic: Chemistry*

102. The opposite of a decomposition reaction is a \_\_\_\_\_ reaction.

**synthesis**

*Difficulty Level: Evaluate/Create*

*Learning Outcome: 02.02*

*Topic: Chemistry*

103. The midpoint of the pH scale is pH \_\_\_.

7

*Difficulty Level: Apply/Analyze*

*Learning Outcome: 02.02*

*Topic: Chemistry*

104. Apricots have a pH of 3.8 and apples a pH between 3.3 and 3.9. Therefore, they are

bases.

*Difficulty Level: Apply/Analyze*

*Learning Outcome: 02.02*

*Topic: Chemistry*

105. Organic substances always contain the element \_\_\_\_\_.

carbon

*Difficulty Level: Remember/Understand*

*Learning Outcome: 02.03*

*Topic: Chemistry*

106. Amino acids are building blocks of \_\_\_\_\_.

protein

*Difficulty Level: Remember/Understand*

*Learning Outcome: 02.03*

*Topic: Chemistry*

107. The amino acid sequence of a protein is its \_\_\_\_\_ structure.

primary

*Difficulty Level: Remember/Understand*

*Learning Outcome: 02.03*

*Topic: Chemistry*



108. Nucleotides are building blocks of \_\_\_\_\_.  
**nucleic acids**

*Difficulty Level: Remember/Understand*

*Learning Outcome: 02.03*

*Topic: Chemistry*

109. \_\_\_\_\_ has the unique ability among types of organic molecules to replicate.  
**DNA**

*Difficulty Level: Remember/Understand*

*Learning Outcome: 02.03*

*Topic: Chemistry*